THURSDAY, SEPTEMBER 27, 1917.

EDUCATION REFORM.

Education Reform: being the Report of the Education Reform Council inaugurated by the Teachers' Guild. Pp. xxxii+215. (London: P. S. King and Son, Ltd., 1917.) Price 5*s*.

IT would be impossible to say much that is new on the subject of education. For three hundred years, at any rate, the objects, methods, and conditions of education from the nursery to the highest places at the university have been the topic of an unbroken and ever-increasing stream of essays, treatises, and newspaper articles. But here is a book in which everything of importance which has been spoken or written about education is reviewed and put into a new order. A national stocktaking is begun, and the Teachers' Guild has got to work with praiseworthy promptitude to provide for the systematic study of the present state of education in England and of the reforms which are needed. The result is the creation of a council to carry out its business. At the initiatory meeting in April, 1916, it was determined that this body should consist of a president (the first president is Sir Henry A. Miers), vice-president, treasurer, honorary secretary, and not fewer than thirty, nor more than fifty, additional members. But the council was given power to co-opt new members, and this power has been exercised so freely that the council is more than double the size originally contemplated. The wonder is that with so many cooks the broth has not been completely spoiled. The reports of the nine committees afford, however, quite interesting and instructive reading.

Readers of NATURE will naturally turn to the reports on university education and the secondary schools, and will look to the position which it is proposed to assign to natural science. Universities and schools have now got past the stage at which it is necessary to discuss the advisability of admitting natural science to a place in the curriculum, and, of course, there is no committee appointed by the Education Reform Council specially to consider what is admitted by the most conservative of "humanists." With regard to universities, it strikes one that while there is much that is admirable in the report, the committee is not strong enough in representatives of the old universities and of the provincial modern universities. It speaks too much from the London point of view. The report points out the desirability of a large increase in the number of students resorting to the universities, so that education of this type may become more commonly a normal part of the preparation for life, and that graduates should find their way more frequently not only into the professions, but also into active life in every direction. With regard to the view, hitherto so common among men of business in this country, that the "university man" has been by his very training at school and university unfitted for business, the report properly points out that graduates differ among themselves perhaps more than any other body of men with a common status. The universities attract a large proportion of the best ability of the country, and much of this ought to be utilised in directing industry and commerce. It should be added that the whole of it ought to be turned to account in one direction or another for the benefit of the country. The sporting landowner who knows nothing about agriculture and does not understand the management of his estate ought to disappear. In the direction of the definite application of science to industry there can be no doubt that there has been a great improvement of late years in the employment of university-trained chemists and engineers, and there is hope that the interests of agriculture will continue to get help in increasing degree from the universities.

As to school curricula, it seems as though the Committee on Secondary Schools had been too much under the influence of tradition or did not possess the boldness necessary to assign a due proportion of time to natural science in the time-table; for in the scheme suggested on p. 69 four hours a week is the maximum. Referring to the correlation of studies, the committee says:—"Training in expression, oral and written, should be given in connection with almost every subject in the curriculum, while the *methods of science* should permeate the whole course of study." The meaning of the words italicised here is far from clear. Correlation between literature and history, between physics and geographical phenomena, one can understand, but science here seems to mean logic, or at least common sense, which is obvious.

In all these discussions it is not sufficiently kept in mind that from the young student's point of view subjects are divisible broadly into—not literary and scientific, the usual antithesis—but "booky" and "non-booky." The former includes even mathematics, the latter means the study of things. There are minds which revel in the former, while there are others which the printed page seems to repel. Even among the latter it must not be forgotten that tastes differ. A young artist has been heard to say, "I enjoy looking at a flower, but when you begin explaining the uses of its different parts I lose interest in it." Young boys also, as a rule, love experiments of all kinds, but hate explanations, and, notwithstanding what has been said to the contrary, the curiosity of most children is soon satisfied, and it is only in later years that explanation of a fact or phenomenon has an interest equal to that of the fact itself. From all these considerations it follows that pupils should be classified not only according to age or as clever or stupid, but also according to the constitution of the mind and its inclination towards thinking or towards doing. The great principle for the teacher to remember is that, before all things, it is necessary to be interesting to the majority of the class. Without this neither rewards nor punishments will secure real attention. Now to be interesting requires that the subject should be well chosen and the teacher himself filled with the enjoyment of it. To secure this condition more commonly, teachers must be not only better qualified, but also better paid.

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Dr. Garnett, chairman of the council, has written an interesting "Foreword" to this book of reports. He directs attention, among other things, to the fact that in some of the most important schools boys on the classical side still learn no science, and to the statements in the report he adds the remark that "the fate of a nation is not likely to depend on the appreciation of music, art, or literature by its rulers, but it may well hang on their appreciation of science." It is to be hoped that the British people, who seem for the present to be fairly well convinced of this truth, will act in conformity with it in demanding that the Government of the country shall no longer be officered exclusively from non-scientific sources.

These reports deal with a great variety of questions, among others with specialisation in schools and universities. In universities the specialisation should not be carried to such an extent as to sever all association with other studies, and especially is it important that science students should not abandon literary studies. Most students, it may be supposed, would shrink from doing so, if only for the sake of the mental refreshment which comes from history, fiction, or poetry in familiar use.

The subject of examinations is dealt with in a report all to itself. We do not now hear so much from the few enthusiasts who, at one time, were for doing away with examinations altogether. The committee says that the evils arising from examinations have been the subject of widespread complaint for half a century. That is true, but it is also shown that this is largely attributable to abuse or defects of the system which admit of remedy. And it is remarked that "in so far as examinations check initiative, it should be noted that candidates for professions whose initiative cannot survive the exact acquirement of the necessary knowledge are not well fitted by nature for such careers." The fact is that where initiative exists it will not be killed so easily. A comparison was made a few years ago between the D.Sc.'s of London University graduated under the original system of pure examination and those who from 1887 onward obtained their degrees on presentation of a thesis and were practically exempt from examination. Contrary to the expectations of those who advocated the change, greatly increased activity in the direction of research has not become manifest as a consequence (see NATURE for November 3, 1910, p. 30). W. A. T.

EXPERIMENTAL EMBRYOLOGY.

(1) *Three Lectures on Experimental Embryology.* By Dr. J. W. Jenkinson. With a Biographical Note by Dr. R. R. Marett. Pp. xvi+130. (Oxford: At the Clarendon Press, 1917.) Price 7*s.* 6*d.* net.

(2) *L'Œuf et les Facteurs de l'Ontogénèse.* Par Prof. A. Brachet. Pp. viii+349+xii. (Paris: O. Doin et Fils, 1917.) Price 6 francs.

THESE two volumes, although they deal with the same subject, are of very different character. Dr. Jenkinson's work aims at being a condensed compendium of the most recent results obtained in this division of zoology. Prof. Brachet's primer, on the other hand, gives a fascinating account of the gradual building up of our knowledge of the mechanisms underlying the development of the egg. He rigidly limits himself in this case to the instances necessary to illustrate his points. The substance of Dr. Jenkinson's book was delivered as three lectures in University College, London, and all zoologists will be grateful to Mrs. Jenkinson for publishing these lectures. Dr. Jenkinson was one of the many men of science who have sacrificed their lives on behalf of their country, but in the division of science which he represented his loss was felt as a peculiarly cruel blow, for experimental embryology has few representatives in England, and amongst those few Dr. Jenkinson was one of the most prominent. From the account of his life by his friend, Dr. Marett, which is contained in this volume, we learn that Dr. Jenkinson began his career in the university by the study of classics and of ancient philosophy, and that he was drawn to the study of biology, not primarily through the love of natural history, but because he regarded the study of the laws of life as the modern counterpart of the questions which had occupied the minds of the ancient philosophers. We can now understand a feature which puzzled many admirers of Jenkinson's "Experimental Embryology," published some years ago, viz. the disproportionate space allotted to the discussion of the views of Aristotle, a subject which to most biologists has only a meagre academic interest.

The volume before us suffers somewhat from being too much crammed with insufficiently digested details to form a textbook of the subject, and must be rather regarded as a sequel to the "Experimental Embryology" referred to above. The first lecture gives a general sketch of some types of embryonic development in order to illustrate the fact that growth, cell-division, and differentiation are the three cardinal facts in embryology which demand explanation. In the discussion of growth Dr. Jenkinson indicates his leaning towards Loeb's theory that growth is due to a chemical reaction, one of the products of which acts as a catalyser to expedite the reaction. This theory, like so many of Loeb's hypotheses, is at first sight attractive, but its entire value lies in its power to be applied in detail. Loeb used it to explain the supposed increase in nuclear matter, which he regarded as the most striking phenomenon of early development, but he measured the increased quantity of this material by counting the number of nuclei without taking into account the fact that the volume of the individual nucleus diminishes as development proceeds. This point is well brought out in a series of figures which Dr. Jenkinson gives.

The second lecture deals with the question of cleavage. A *résumé* is given of some of the more striking results of separating individual blastomeres from each other in different types of egg and allowing them to develop independently

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